

CLAIMS

What is claimed is:

1. Apparatus for forming a trench and preparing a base region of the trench for laying an elongate member such as a pipeline, cable or the like therein, said apparatus including a trench forming machine having excavating means adapted to excavate the trench as the trench forming machine is moved in a forward direction, bedding material forming means positionable, in use, at least partly above the trench formed by the excavating means of said trench forming machine and being adapted to move simultaneously along said trench with said trench forming machine as the trench forming machine moves in said forward direction, said apparatus further including conveyor means for conveying at least a portion of excavated trench material created by said excavating means immediately after excavation to said bedding material forming means, said bedding material forming means including separation means for separating fine particulate material from the excavated trench material delivered thereto by said conveyor means whereby said fine particulate material is adapted to be delivered to the base region of said trench.

2. Apparatus according to claim 1 wherein said bedding material forming means forms an integral part of said trench forming machine.

3. Apparatus according to claim 1 wherein said bedding material forming means is separate from said trench forming machine but in use is pulled along said trench by connection means to said trench forming machine.

4. Apparatus according to claim 3 wherein said connection means includes at least one cable or chain extending between said trench forming

machine and said bedding material forming means.

5. Apparatus according to claim 4 wherein said at least one cable or chain is angled downwardly from said trench forming machine to said bedding material forming means with a connection of said at least one cable or chain to said bedding material forming means being below an upper edge of said trench.

6. Apparatus according to claim 1 wherein said conveyor means includes a first conveyor extending transversely relative to said trench said first conveyor being positioned to receive the excavated trench material from said excavating means and to deliver same at a downstream end of said first conveyor to a second conveyor extending rearwardly to said bedding material forming means.

7. Apparatus according to claim 6 wherein said first conveyor is made up of at least one individual conveyor unit.

8. Apparatus according to claim 6 wherein said second conveyor is made up of at least one individual conveyor unit.

9. Apparatus according to claim 6 wherein baffle means is provided adjacent the downstream end of said first conveyor whereby excavated material on said first conveyor is deposited on said baffle means if the first conveyor is moved at a speed above a first predetermined limit, and onto said second conveyor if the speed of said first conveyor is below the first predetermined limit, said baffle means being configured to deliver excavated material deposited thereon to a ground position adjacent said trench.

10. Apparatus according to claim 9 further including control means to vary the speed of said first conveyor to thereby selectably vary the amount of

excavated trench material delivered by said second conveyor to said pipeline bedding material forming means.

11. Apparatus according to claim 1 wherein said trench forming machine includes scraper means arranged to push excavated material thrown out of the trench by said excavating means back into the trench to be reprocessed by said excavating means.

12. Apparatus according to claim 11 wherein said trench forming machine is supported on crawler track means on either side of the trench being formed by said excavating means, said scraper means being formed by ground engagable scraper blades positioned rearwardly of each crawler track means and adjacent to said excavating means.

13. Apparatus according to claim 1 wherein said pipeline bedding material forming means includes a structure positionable in the trench and configured to enable movement along the trench, said structure having a lower region adapted to receive said fine particulate material from said separation means and a lower face leading from said lower region through which said fine particulate material is discharged into a bottom region of said trench.

14. Apparatus according to claim 13 further including adjustable levelling means located rearwardly of the discharge of fine particulate material from said lower region of the structure to adjust the depth of said fine particulate material in said trench.

15. Apparatus according to claim 13 wherein the separating means includes a vibrating screen table that is wider than the trench and is inclined to one side whereby the excavated material deposited thereon that does not pass

through the screen table drops from the screen table on said one side to a ground position.

16. Apparatus according to claim 15 wherein support skids are positioned to engage the ground on either side of the trench and on either side of the bedding material forming means in front of any excavated material falling from the vibrating screen table.

17. Apparatus according to claim 16 wherein the height of said support skids relative to the structure within said trench is adjustable.

18. A method of forming a trench and preparing a base region of the trench for laying an elongate member such as a pipeline or cable therein, said method including the steps of providing a trench forming machine and excavating ground material from a zone intended to form the trench while moving said trench forming machine in a forward direction, conveying at least a portion of said ground material excavated from said zone intended to form the trench immediately after excavation directly to separation apparatus for separating fine particulate material from the excavated ground material and depositing the fine particulate material into the base region of said trench as said separation apparatus is moved along said trench with said trench forming machine.

19. A method according to claim 18 wherein said separation apparatus includes a portion located in said trench, said portion including means for distributing and levelling the fine particulate material in the base region of the trench.

20. A method according to claim 19 wherein said means for distributing and levelling the fine particulate material in the base region of the trench includes

means for creating a groove in said fine particulate material into which the elongate member is laid.

21. A method according to claim 18 wherein a portion of the excavated ground material is selectably deposited onto the ground adjacent the trench instead of being conveyed to the separation apparatus.

22. A method according to claim 18 wherein coarser particulate material of said excavated ground material that is not deposited into the base region of the trench is discharged from said separation apparatus onto the ground adjacent said trench.

23. A method of laying an elongate member in an underground position, said method including the steps of providing a trench forming machine and excavating ground material from a zone intended to form a trench while moving said trench forming machine in a forward direction, conveying at least a portion of said excavated ground material from said zone intended to form the trench immediately after excavation directly to first separation apparatus for separating fine particulate material from the excavated ground material and depositing the fine particulate material into a base region of the trench as said first separation apparatus is moved along said trench, laying said elongate member on said fine particulate material in the base region of said trench, and thereafter passing second separation apparatus along said trench, said second separation apparatus also receiving at least a portion of said excavated ground material and delivering fine particulate material from said excavated ground material into said trench depositing same around and over said elongate member.

24. A method according to claim 23, wherein said elongate member is a pipeline or conduit of continuous length or of joined separate sections.

25. A method according to claim 23, wherein said first separation apparatus is part of or operationally connected to said trench forming machine.

26. A method according to claim 25, wherein said first separation apparatus includes a portion located in said trench, said portion including means for distributing and levelling the fine particulate material in the base region of the trench.

27. A method according to claim 26, wherein said means for distributing and levelling the fine particulate material in the base region of the trench includes means for creating a groove in said fine particulate material into which the elongate member is laid.

28. A method according to claim 23, wherein a portion of the excavated ground material is selectably deposited onto the ground adjacent the trench instead of being conveyed to the first separation apparatus.

29. A method according to claim 23, wherein coarser particulate material of said excavated ground material that is not deposited into the base region of the trench is discharged from said first separation apparatus onto the ground adjacent said trench.

30. A method according to claim 28, wherein the excavated ground material deposited on the ground is at least partially picked up and delivered to said second separation apparatus.